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ABSTRACT

The results of a curriculum evaluation can be used in inservice sessions as a focal point for decision-making by classroom teachers. Among the questions that may be asked during a curriculum evaluation are: (1) How well do students achieve the stated objectives of the curriculum?; and (2) At what points in the instructional sequence does instruction need to be modified? By looking at student performance on each objective of the curriculum, answers to these questions can be obtained. This may be accomplished by evaluating the results of pre- and post-tests. This approach to inservice decision making was tested by science students and teachers at three junior high schools. (BB)

THE USE OF CURRICULUM EVALUATION AS A TOOL FOR INSERVICE DECISION-MAKING BY CLASSROOM TEACHERS

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In deciding to implement a new curriculum, most school systems do so with the hope for improvement in student performance. The degree of success of the new curriculum can be judged only if evaluation of the program is made. Instruction is effective only if it leads to learning--a change in behavior. In much the same way curriculum evaluation is most effective only if the evaluation helps the classroom teacher make more intelligent decisions about instruction. The results of a curriculum evaluation can be used in inservice sessions as focal points for decision-making by classroom teachers.

Among the questions that may be asked during a curriculum evaluation are two of direct concern to classroom teachers. How well do students achieve the stated objectives of the curriculum? At what points in the instructional sequence does instruction need to be modified? By looking at student performance on each objective of the curriculum, answers to both questions can be obtained.

Conscientious teachers will attempt to make decisions about the effectiveness of instruction and modify subsequent instruction as deemed necessary. The results of end-of-unit tests or posttests can be judged by the teacher as satisfactory or unsatisfactory. When performance is judged unsatisfactory, such questions may be asked as (1) Was the objective appropriate?; (2) Was the assessment item(s) appropriate for the objective (and properly constructed)?; and (3) Was instruction and practice appropriate for the objective? For those objectives where performance is judged satisfactory, an unknown exists. Did the students already know that objective before instruction took place? This question is rarely asked. The use of a pretest in addition to the posttest can provide information to answer this question.

In addition to the question of student performance there is the question of teacher performance. Did the teacher provide adequate instruction to enable the student to achieve the objective? This question is harder to answer than the question of student performance, but is one that needs to be considered when making decisions about effectiveness of instruction.

The possible student outcomes that can result from the use of pre- and posttest data is illustrated by the following matrix.

Pre	+	III	II
	–	IV	I
		–	+
		Post	

Figure 1. Outcomes Possible from Pre- and Posttest Data.

Examining each of the four outcomes illustrated by the matrix can generate questions for teachers to use to improve instructional effectiveness.

OUTCOME I: Pre: students not successful (-)
Post: students successful (+)

We are pleased when students are able to demonstrate achievement after instruction on objectives they did not know before instruction. This is the desired state of affairs. Teachers have the satisfaction of knowing they taught and students learned.

OUTCOME II: Pre: Students successful (+)
Post: students still successful (+)

This situation is not nearly as positive as the first. Such situations are probably indicative of objectives that are too simple, are covered in previous science courses, or need to be placed earlier in the curriculum. Teachers cannot take much credit for these situations. Without preinstruction diagnosis (pretesting), these outcomes are not likely to be detected.

OUTCOME III: Pre: students successful (+)
Post: students now not successful (-)

This is a rather unusual and uncomfortable situation. Whatever went on during instruction served to confuse the students rather than help them or perhaps they just guessed luckily on the pretest. Another possibility is that the posttest item did not measure the same thing the pretest item measures.

OUTCOME IV: Pre: students not successful (-)
Post: students still not successful (-)

Questions that might arise from this situation are:

a. Were the objectives too difficult for the students?

b. Were needed prerequisite skills lacking?

c. Was the assessment item(s) the problem?

Another series of questions that might arise from this situation centers on the teacher rather than on the students or assessment instruments. A teacher might ask:

a. Did I know the topic well enough to work with the student or am I avoiding it because I am uncertain of it myself?

b. Am I interested in the topic--or do I avoid it because it is very dull for me?

c. Did I have time to work with this topic--or did I skim over it to finish before grade cards or vacation?

d. Did I have the materials I needed--or did the lesson require more materials and/or time to prepare than I had?

An evaluation of the Intermediate Science Curriculum Study (ISCS) curriculum and the Ideas and Investigations in Science (IIS) curriculum was undertaken in a southeastern urban school district. Data like those in Figure 1 were collected. Inservice activities for the junior high school science teachers were conducted during the school year. The focus of this paper is on the use of pre- and posttest evaluation data to provide useful inservice development for teachers.

Methods and Procedures

There were approximately 1550 students in the three junior high schools participating in the study. Twenty-six teachers were involved with a total of 104 classes. Students were placed by the school system in either the Intermediate Science Curriculum Study (ISCS) or Ideas and Investigations in Science (IIS) depending on student ability level. Students of high and average ability were enrolled in ISCS and students of low ability were enrolled in IIS. Grade seven students were in ISCS Level I or IIS-Life Science. Grade eight students were in ISCS Level II or IIS-Earth Science. Only low ability ninth grade students were included in the study. These students were enrolled in IIS-Physical Science. Student ability level was determined by a student performance on standardized achievement tests and previous academic performance.

A one-week inservice workshop was conducted before school began to assist teachers in understanding the philosophy, methodology, and materials and equipment of both the ISCS and IIS programs.

Instruments Used

Tests were selected or constructed based on the stated objectives or activities of both programs. For the ISCS program, the assessment items written by the ISCS project were used. For the IIS program criterion-referenced assessment items were constructed to meet the objectives or activities of the program. These items were assembled in units to give pre- and posttests that corresponded to chapters of the ISCS program and investigations of the IIS program.

For ISCS Level I (grade 7), twelve units were covered.

For ISCS Level II (grade 8), sixteen units were covered.

For the IIS curriculum, units covered were: grade 7, 7 units, grade 8, 3 units; and grade 9, 3 units.

The same test was used for both pre- and posttests, thereby raising an internal validity threat to the study. However, to decrease the testing effect, the results of the pretests were not returned or discussed with the students.

Data Collected and Decision Rule

Data collected were frequency counts of number of students successful on each objective of the program. By a consensus of the teachers involved, a decision rule of 80% of students successful 80% of the time was adopted as the cut-off point for satisfactory student performance. This led to a 64% success rate for performance on an objective to be judged satisfactory.

Results

A percentage success rate for each objective was determined by dividing the total number of correct responses by the total number of students tested on that particular objective. The number of students fluctuated due to movement of students in and out of the schools during the year.

The results were compiled for the entire student population and were summarized by tallying the number of objectives that fell into each of the outcome categories discussed above. These data are presented in Table 1.

Discussion

As can be observed by inspection of Table 1, the success rate under the programs can not be judged an overwhelming success. These results were then used to plan for an inservice workshop following the

Table 1

Summary of Number (and Percent) of Objectives for Each Outcome Category for Each Science Curriculum

Outcome Category			Science Curriculum				
			7 ISCS n = 512	8 ISCS n = 427	7 IIS n = 211	8 IIS n = 216	9 IIS n = 180
	Pre	Post					
I	-	+	25 (46)	42 (66)	31 (66)	16 (44)	17 (71)
II	+	+	3 (6)	2 (3)	2 (4)	0 (0)	2 (8)
III	+	-	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
IV	-	-	26 (48)	20 (31)	14 (30)	20 (56)	5 (21)
Total Number of Objectives			54	64	47	36	24

implementation year. Utilizing the framework for interpretation of results presented above, the teachers spend the follow-up workshop making revisions as deemed necessary.

For ISCS Level I (grade 7), revisions were made in some assessment items, plans to present the topics in other ways, and some alternative activities were provided. Perhaps the major sentiment voiced by these teachers was the felt need for additional course work that would cover topics pertinent to ISCS Level I. This may be a major reason that student performance on these objectives is low. The topics of force, work and energy in ISCS Level I are quite different from the topics in the life science course these teachers had taught previously.

The eighth grade ISCS teachers (Level II) were more comfortable with their competence in the material. Revisions on this level were focused on assessment items and alternative presentation strategies.

The teachers of the three levels of IIS approached the revision task from a common perspective. One decision was to assess the low ability students more frequently. Revision of objectives was deemed to be necessary, particulary for grades 7 and 8. In some cases, objectives were completely rewritten to reflect more likely outcomes of the activities. In other cases where the objectives were deemed to be appropriate, alternative activities were planned to accomplish these objectives.

The results under Outcome III (pre: +, post: +) indicate that students are encountering few objectives they already know. This suggests that the use of pretests can probably be deleted for subsequent years.

In addition to participating in the overall revision process, each teacher had his/her own record of class performance and made additional plans for "personal" revision for the subsequent year.

Based on informal feedback about the process of data gathering and analysis used in this study, the teachers felt they had a mechanism they could readily use to make more intelligent decisions about instruction. Planning inservice activities based on student achievement of objectives was judged by the teachers to make optimum use of the inservice time.